CLAIMS LISTING

1.(original) A degasser for molten metal comprising:

a microporous plate comprising at least one internal passageway and an interface tube attached to said microporous plate in flow communication with said internal passageway.

2.(original) The degasser of claim 1 further comprising a second interface tube in flow communication with a second internal passageway.

3.(original) The degasser of claim 2 wherein said second internal passageway and said internal passageway form a cavity.

4.(original) The degasser of claim 1 wherein said microporous plate has a critical metallostatic pressure (H_p) for penetration by aluminum at a predetermined operating depth defined by the equation:

$$H_p > 4\,\gamma_{is}(\cos\theta)/g\rho\phi$$

wherein:

γ_{is} is interfacial surface energy between said microporous plate and said metal,

θ is contact wetting angle of molten metal on said microporous plate,

g is Newton's constant,

ρ is the liquid metal density and

ϕ is the pore opening size of said microporous plate.

5.(original) The degasser of claim 1 wherein said microporous plate comprises passages.

6.(original) The degasser of claim 1 wherein said passages have an equivalent diameter of at least about 500 microns to no larger than about 50 mm.

7.(original) The degasser of claim 6 wherein said passages have an equivalent diameter of at least about 5 mm to no more than about 7.5 mm.

8.(original) The degasser of claim 5 wherein said passages are separated by a distance between about 0.5 to 10 times an equivalent diameter of said passage.

9.(original) The degasser of claim 1 wherein said microporous plate is about 3 mm to about 200 mm thick.

10.(original) The degasser of claim 1 further comprising a containment vessel with said microporous plate contained in said containment vessel.

11.(original) The degasser of claim 10 further comprising a filter in said containment vessel.

12.(original) The degasser of claim 1 further comprising a monitor in flow communication with said interface tube for monitoring gases flowing therethrough.

13.(original) A method for purifying molten metal comprising the steps of:

melting metal to form molten metal;

passing said molten metal through a containment vessel wherein said containment vessel comprises a degasser and wherein said degasser comprises a microporous plate comprising at least one internal passageway and an interface tube attached to said microporous plate in flow communication with said internal passageway; and

removing hydrogen from said microporous plate through said interface tube.

14.(original) The method for purifying metal of claim 13 wherein said containment vessel further comprises a filter.

15.(original) The method for purifying metal of claim 14 wherein said metal passes through said microporous plate prior to passing through said filter.

16.(original) The method for purifying metal of claim 13 wherein said microporous plate has a critical metallostatic pressure (H_p) defined by the equation:

$$H_p > 4\,\gamma_{is}\,(\cos\theta)/g\rho\phi$$

wherein:

Hp is critical pressure for capillary penetration,

γ_{is} is interfacial surface energy between said microporous plate and said metal,

θ is contact wetting angle of molten metal on said microporous plate,

g is Newton's constant,

ρ is the liquid metal density and

ϕ is the pore opening size of said microporous plate.

17.(original) The method of claim 13 wherein said hydrogen is removed by vacuum applied to said interface tube.

18.(original) The method of claim 13 wherein said hydrogen is removed by flowing a purge gas through said degasser.

19.(original) The method of claim 13 wherein said microporous plate comprises passages.

20.(original) The method of claim 19 wherein said passages have an equivalent diameter of at least about 500 microns to no larger than about 50 mm.

21.(original) The method of claim 20 wherein said passages have an equivalent diameter of at least about 5 mm to no more than about 7.5 mm.

22.(original) The method of claim 19 wherein said passages are separated by a distance between about 0.5 to 10 times an equivalent diameter of said passage.

23.(original) The method of claim 13 wherein said microporous plate is about 3 mm to about 200 mm thick.

24.(original) The method of claim 13 wherein said degasser further comprising a monitor in flow communication with said interface tube for monitoring gases flowing therethrough.

25.(original) An apparatus for purifying molten metal comprising:

a containment vessel comprising an inlet throat and an outlet throat; and

a degasser between said inlet throat and said outlet throat wherein said degasser comprises a microporous plate comprising at least one internal passageway and an interface tube attached to said microporous plate in flow communication with said internal passageway.

26.(original) The apparatus for purifying metal of claim 25 further comprising a filter.

27.(original) The apparatus for purifying metal of claim 26 wherein said filter is between said degasser and said outlet throat.

28.(original) The apparatus for purifying metal of claim 26 further comprising an equalization space between said degasser and said filter.

29.(original) The apparatus of claim 25 wherein said outlet throat comprises a first transition region comprising a downward sloping floor and a drain in said floor.

30.(original) The apparatus of claim 29 wherein said outlet throat further comprises a second transition region comprising an upward sloping floor.

31.(original) The apparatus of claim 24 further comprising a monitor in flow communication with said interface tube for monitoring gases flowing therethrough.